



THE INDIAN JOURNAL OF OCCUPATIONAL & ENVIRONMENTAL MEDICINE 1997-2012: BIBLIOMETRIC ANALYSIS

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ABSTRACT

This study analyses the patterns of publication of the Indian Journal of Occupational & Environmental Medicine from 1997 to 2012. The study finds that IJOEM principally publishes papers in form of original articles. The journal has constantly published elaborated articles ranging from one to twenty pages. The study further reveals that larger chunk of research publications in the journal are in multi authorship mode owing to multiple discipline involved scientific assignment. The degree of collaboration in the publications of the journal is found to be **0.740**. Most frequently occurred keywords indexed in the articles of the journal are: Physically Inactivity and Occupational Health. Moreover, the study finds that, the journal has accommodated the papers contributed from Indian different states and different countries like Iran, Nigeria, UK, Italy Turkey Canada etc.

KEYWORDS: Bibliometric Study, Physically Inactivity Occupational Health

INTRODUCTION

Bibliometrics is a set of mathematical and statistical methods used to analyze and measure the quantity and quality of books, articles, and other forms of publications. There are three types of Bibliometrics indicators: *quantity indicators*, which measure the productivity of a particular researcher, or a group of researchers; *quality indicators*, which measure the quality (or “performance”) of a researcher, or a group’s output; and *structural indicators*, which measure connections between publications, authors, and areas of research.(1)

Bibliometrics / Scientometrics research includes studies related to the scattering & growth of literature, author productivity, distribution of scientific literature by country, language etc which helps to monitor the growth pattern of research.

Pritchard (1969) is known as the founder of the term ‘bibliometrics’ who defined the concept as, “the application of mathematical and statistical methods to books and other communication medium”. Small’s (2006) definition on ‘bibliometrics’ cited by Maharana (2013) is, “a method for description, evaluation, and monitoring of research surrounding of a particular field or it can describe the quality and focus of research output by a particular organization”. With the advent of Information and Communication Technology (ICT), faster web applications, and availability of online journals and databases, the field of bibliometrics has gained momentum (Patra et al 2006). Currently, bibliometric studies are conducted for a given field of knowledge on specific literature, research output of a prolific author, research productivity of an organization.

LITERATURE REVIEW

In paper of Meenakshi Bhan Harith & Har Singh (2014) analyses the various bibliometric components of articles published in Indian Journal of International Law (IJIL) 326 articles which were published during the period under study from 1960 to 2010. The paper covers the quantitative growth of articles by volume and year, distribution of citations by volume and year, range and percentage of citations per article, authorship pattern of articles, authorship productivity, ranked list of most prolific contributors, ranked list of authors by geographical affiliation, ranked list of authors by profession, ranked list by subjects of articles and journal self-citation in the articles.(2)

Hussain Akhtar and Fatima Nishant (2011) studied demonstrates and elaborates on the various aspects of various journal. It provides a comprehensive overview of authorship in Library & Information sciences.

Jena, K. L., Swain, D. K., & Sahu, S. B.(2012). The study aims to divulge the patterns of scholarly communication of The Electronic Library from 2003 to 2009 and to measure the coverage and quality of contributions of this journal towards LIS literature

Maharana, R. K. (2013). The present study analyses the growth, contribution, and impact of research carried out by the researchers at the Orissa University of Agricultural Technology (OUAT), Bhubaneswar, India, based on the publications indexed in Scopus during 2008 to 2012. It is identified that the average annual publications range from 33 to 34 papers, with 0.96 degree of collaboration. The maximum number of papers is published within the 1-5 page range. It also shows that Indian Journal of Animal Research is the most preferred research journal among the university research community

Patra, S. K., Bhattacharya, P., & Verma, N.(2006) This paper analyses growth pattern, core journals and authors' distribution in the field of bibliometrics using data from Library And Information Science Abstracts (LISA) It shows the Bardford law of scatter and Lotaks law to identify authors' productivity patterns.

Pitchard, A (1969) has shown difference between bibliography and bibliometrics, In conclusion it is mentioned that BIBLIO METRICS will be used explicitly in all studies which seek to quantify the processes of written communication and will quickly gain acceptance in the field of information science. Described the Bibliometrics as the application of mathematics and statistical methods to books and other media

Rajendran P, Jeyshankar R, Elango B (2011): Scientometric analysis of 633 research articles published in Journal of Scientific and Industrial Research has been carried out. The analysis explores that the majority of papers by multi authors and Indian authors. The study revealed that the journal seems to be popular among the international research community with around 25% of papers.

Swain DK, Swain C, Rautaray B, (2014) This study examines the patterns of publications in the *Journal of Educational Media and Library Science* (JoEMLS) from 2008 to 2012. It is observed that publications of JoEMLS are led by two-author papers, followed by single-author papers and three-author papers

Swain D K, Swain C & Rautary B: (2014) The study analyses the patterns of publications of the journal Business Economics from 2008 to 2013. The study finds that Business Economics principally publishes papers in the form of articles, reviews, editorials, and conference papers.

Thanuskodi S (2011) this paper presents a bibliometric analysis of the journal titled "Library Herald" for the

period between 2006 to 2010 The analysis cover mainly the number of articles, authorship pattern, subject wise distribution of articles, average number of references per articles, forms of documents cited, year wise distribution of cited journals. All the studies point towards the merits and weakness of the journal which will be helpful for its further development

Warrach N F & Ahmead S(2011) Pakistan journal of library and Information Science is an outstanding contribution in the dissemination of LIS research on national and international level as it publishes both in print and electronic format. A bibliometric analysis of contributions published in the PJLIS from 1995 to 2010 has been presented in this paper. Attempt has been made to study all 11 issues of this journal on the basis of different parameters,

Most of the above mentioned studies are undertaken to understand the publication distribution pattern of articles published in a particular journal. Area covered is authorship pattern, geographical distribution citation pattern average length of articles ET

IJOEM

Indian Journal of Occupational & Environmental Medicine (IJOEM) is a core journal for the researchers working on occupational and Industrial Health. The Indian Journal of Occupational & Environmental Medicine (IJOEM) is quarterly publication of the Indian Association of Occupational Health (IAOH). It is the country's leading journal devoted to this field. All articles published in the IJOEM are copyrighted. First 2 journals namely Indian journal of Occupational Health and Indian Journal of Industrial Medicine published by IAOH, then in December 1997 it was merged and one new journal titled Indian Journal of Occupational & Environmental Medicine (IJOEM) published.

OBJECTIVES OF THE STUDY

The key objectives of this study are:

- To ascertain number of papers published in the IJOEM from 1997-2012
- To study average length of article
- To study the nature of authorship pattern
- To study authorship productivity
- To study state wise and country-wise distribution of articles.
- To study the subjects covered by journal
- To determine degree of collaboration
- To study the citation pattern of authors of IJOEM

Need for the Study

The periodical in the concerned field is the indicator of literature growth rate and development. It is the standing testimonial to emerge as growth and development. Owing to the exorbitant cost of the periodicals available in the market and anemic financial resource, the concerned authority has to envisage the strategic maneuver to accommodate the readers' quench. In such a conspiracy of circumstances, the library authorities have to maintain the equilibrium by applying bibliographical guts to overwhelm the pecuniary crunch.

METHODOLOGY

Each issue of the source journal in a define stipulated stretch was opened and gleaned the earmarked parameters and fed them in Excel sheet to study in detailed. The requisite information from year 2003- 2012 was collected from the website of IJOEM archives and prior to that the pertaining information was drawn from hard copy of Indian Journal of Occupational & Environmental Medicine. In the year 1997 and from 2003 to 2012, some issues were not published, were excluded from the study.

In type of articles following sections are excluded from the preview of the study.

- Editorial/Guest editors
- Sponsored Feature's
- Window to events
- Obituary
- Conference Information
- Key note address
- News Line
- End Quote
- Book Review

Accessible Information from the source journal in the stipulated stretch was well organized and displayed highlight the variation either in the format of tabulation or graphic layout.

Data Analysis

The researchers have extracted all the required information related to the articles in total 389 articles published from 1997 to 2012, from the hardbound journals and website. All the details such as author(s), title, year of publication, institutional affiliation, etc. of all articles have been used for the following analysis.

Table 1: Year & Wise Distribution of Contribution

Year	Issue 1	Issue 2	Issue 3	Issue 4	Total	%
97	4				4	1.02
98	7	8	8	11	34	8.74
99	10	9	8	9	36	9.25
2000	10	10	11	7	38	9.76
2001	9	9	8	7	33	8.48
2002	7	10	7	0	24	6.16
2003	8	7			15	3.85
2004	8	6			14	3.59
2005	9	8	7		24	6.16
2006	8	9	9		26	6.68
2007	8	8	4		20	5.14
2008	7	8	8		23	5.91
2009	9	8	8		25	6.42

Table 1: Contd.,

2010	4	7	9		20	5.14
2011	9	5	11		25	6.42
2012	9	8	11		28	7.19
	126	120	109	34	389	

Table 1 shows the distribution of articles in the journal by year. Of the total 389 articles, the maximum number of articles were published in the year 2000, contributing 38 (9.76%) to the total number of articles, while 36 (9.25%) in the year 1999, followed by distribution of 34(8.74%) article in 1998. The minimum numbers of articles were published in the year 1997 with 4 articles, Because only one issue was published. In the year 2003 & 2004 only 2 issues were analyzed because other issues were not available. 2005 onward only 3 issues were published, whereas from 1998-2002, only 4 issues were published.

Table 2: Authorship Pattern

Year	Single	Two	three	Four	More than Four	Total
1997	2	1		1		4
1998	16	6	8	3	1	34
1999	8	13	10	2	3	36
2000	10	11	12	3	2	38
2001	14	7	5	4	3	33
2002	7	4	10	2	1	24
2003	7	2	3	2	1	15
2004	3	2	6	3		14
2005	10	6	3	2	3	24
2006	4	9	8	3	2	26
2007	1	5	5	6	3	20
2008	6	5	8	1	3	23
2009	4	9	3	1	8	25
2010	3	6	5	3	3	20
2011	4	3	7	7	4	25
2012	2	10	6	5	5	28
	101	99	99	48	42	389

Table 2 shows the authorship patterns of the articles published during the period of study. The largest number of articles had been published by single author 101 (25.96%) this was followed by two authors and three authors 99(25.44%). There were small percentage of articles published by four and more than four authors with 48(12.33%) and 42(10.79%) of the total articles respectively. This shows that out of 389 articles only 101 articles were published with single author where as remaining 288 with multi authored articles which shows that occupational & Environmental health is a multi disciplinary subject, which cannot work alone in its field.

DEGREE OF COLLABORATION

To determine degree of collaboration in quantitative terms, the formula given by

K Subramanyam (1983) was applied. The formula is:

$$C = \frac{NM}{NM + NS}$$

Where C= Degree of collaboration

NM=Number of multi authored papers

NS= number of single authored papers

In the present study the value of C is 0.740

Table 3: Year Wise Distribution of Degree of Collaboration Cumulative

Year	Single	Two	Three	Four	More than Four	Total	Degree of Collaborations
1997	2	1		1		4	0.5
1998	16	6	8	3	1	34	0.529
1999	8	13	10	2	3	36	0.777
2000	10	11	12	3	2	38	0.736
2001	14	7	5	4	3	33	0.575
2002	7	4	10	2	1	24	0.703
2003	7	2	3	2	1	15	0.533
2004	3	2	6	3		14	0.785
2005	10	6	3	2	3	24	0.703
2006	4	9	8	3	2	26	0.583
2007	1	5	5	6	3	20	0.95
2008	6	5	8	1	3	23	0.739
2009	4	9	3	1	8	25	0.84
2010	3	6	5	3	3	20	0.85
2011	4	3	7	7	4	25	0.84
2012	2	10	6	5	5	28	0.928
	101	99	99	48	42	389	

Table 3 shows that the majority articles published were contributed by single author; remaining 288 published articles were by multiple authors. It is evident that occupational health and medicine are multidisciplinary area of investigation. It needs to safeguard the hypothesis by incorporating many related fields. However overall degree of collaboration is 0.740, the trend is in favor of multi author Publications

Table 4: Categorical Wise Contribution of Articles

Type	97	98	99	2000	01	02	03	04	05	06	07	08	09	10	11	12	Total	%
BC									2	3	3			2	2	1	13	3.34
CR														2	1	3	6	1.54
CS	1	4	4	4	4	3	1										21	5.39
Ergo								1									1	0.25
Essay		1															1	0.25
FS								1									1	0.25
GA	1	3	6														10	2.57
MI							1										1	0.25
OA	2	12	11	11	14	12	5	8	16	17	15	14	17	10	14	20	198	50.89

Table 3: Contd.,

Orati on		2													2	0.514	
PC		1	2	7											10	2.57	
RA															1	0.25	
REV		3	4	8	6	5	2		6	6	2	9	8	6	3	76	19.53
S art					5	1	4	3								13	3.34
SC		1	4	5	3	3	2	1								19	4.88
SR		1														1	0.25
VP		3	5	2	1											11	2.82

BC-Brief Communication, CR-case report, CS-Case study, Ergo-ergonomics, FS-Field Study, GA-Guest article, MI- management interface ,OA-original article, PC preliminary Communication. RA-research article, Rev –Review, S art, Special article, SC- Short communication, SR-special report VP-view point

Table 4 focuses on the category wise classification of the papers published in the stipulated stretch. The study reveals that the maximum number of articles was published as under the category of research paper i.e. Original articles 198 (50.89%), whereas Review articles were 76(19.53 %). Articles were published under the case study category i.e. 21(5.39%). Under category Ergonomics, Essay, Management Interface, Research article, Special report, IS & Comments were only one article. Remaining categories published articles ranging from 10-19.

Table 5: Geographical Distribution of Contribution

State	97	98	99	2000	01	02	03	04	05	06	07	08	09	10	11	12	Total
Andra Pradesh		1	1	3	1	2		2						1		1	12
Arunachal P												1					1
Chandigarh									1	1	1					1	4
Chattisgarh	1	1	1												1		4
Goa			1	1		2		1									5
Gujarat	3	3	1	3	2	2	2	5	3	1	4	1	4		3	37	
Haryana												1					1
Jharkhand				1	1										1		3
Jammu Kash														1			
Karnataka	4	2	3	3	5		1	2	1		1	1	4		5	32	
Kerala									1								1
Maharastra	2	10	13	12	11	7	5	4	4	3	1	4	6	2	7	4	95
Madhya Pradesh			1												1		2
Nil	1		1	1	1												4
New Delhi		2	3	5	4	1			1	1	1		1	1		1	21
Odisha	1						1			2	1				1	1	7
Pondichery															1		1
Rajasthan								1									1
Tamil Nadu		3	5	3	3		3	2	4	3	1	1			1	2	31
Uttar Pradesh	1	2	1	3	2	1	1			3	3	3	3		2	1	26
Uttarakhand																1	1
West Bengal		3	4	3	3	3	2	2		3	1	1	1		3	3	32
International		4		1					5	4	8	6	8	5	4	2	47
Collaboration National					1	1	1		1	1	1		2	1	3	2	14

Table 5: Contd.,

Collaboration International								1		1	1	1	1	1		6	
																388	
Total	4	34	36	38	33	24	15	14	24	26	20	23	25	20	25	28	389

Table 5 shows about the places from where the articles were received for publications. Out of 389 articles, 95(24.42%) articles were received from Maharashtra, followed by Gujarat 37(9.51%) and Karnataka 32(8.22%). 14(3.59%) articles were published where their collaborations between two states were observed. There were 4 articles which did not mention address.

Following table 5a shows Articles were received from different countries. IJOEM received articles from different 18 countries, in that most frequent was Iran with 15 articles followed by Nigeria with 6 articles. Collaborations between two countries were also seen in 6 (1.54%) articles.

Table 5a: Geographical Distribution of Contributors (International)

	Country	Articles	%
1	Iran	15	31.25
2	Nigeria	6	12.5
3	United Kingdom	5	10.41
4	Italy	3	6.25
5	Turkey	3	6.25
6	Canada	2	4.16
7	Thailand	2	4.16
	USA	2	4.16
8	Austria	1	2.08
9	Brazil	1	2.08
10	California	1	2.08
11	Egypt	1	2.08
12	Japan	1	2.08
13	Malaysia	1	2.08
14	Mauritius	1	2.08
15	Mexico	1	2.08
17	UAE	1	2.08
18	UNIDO	1	2.08

A total of 714 authors contributed in all 389 articles from 1997-2012. Table shows that Tiwari R R contributed highest numbers of 17 papers, these articles are singled author article as well multiple author articles also. Followed by Rastogi S K 16 articles and so on

Table 6: Prolific Authors

Sr no	No of Papers	No of Authors
1.	17	01
2.	16	01
3.	14	01
4.	13	01

Table 6: Contd.,

5.	9	01
6.	7	2
7.	6	4
8.	5	5
9.	4	13
10.	3	24
11.	2	98
12.	1	563

Keywords in IJOEM

It is observed that there are 769 key words given in 389 articles, out of which 22 articles were without references. 745 key words appeared only once in article, Physical Inactivity is a key word which appear 21 times, followed by occupational health 15 times and silicosis for 12 times, further it can be said 3 key words for 8 times. 769 keywords appeared only once. 22 articles were such which did not had any keywords.

Table 7: Analysis of Keywords

Keyword	Frequency of Key words	No of Key Words Appearance
Physical Inactivity	21	1
occupational health	15	1
silicosis	12	1

Figure 1 shows that IJOEM is an important journal in the field of occupational health and medicine. Articles published vary its length from page 1 to page 22.

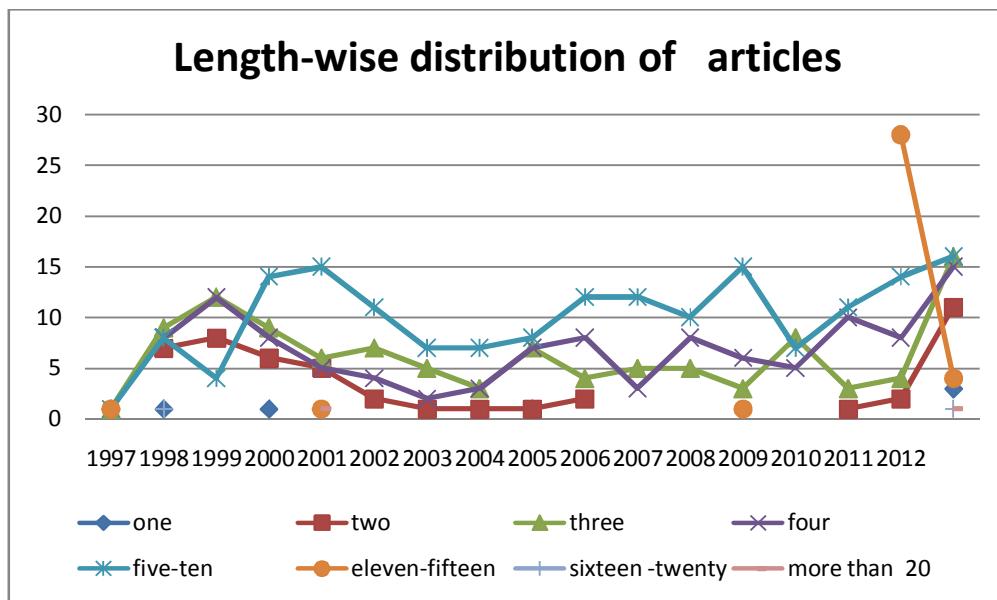
**Figure 1: Length-Wise Distribution of Articles**

Figure 2 show that each article has its own format i.e. From Introduction to references. In IJOEM variations have been seen. Maximum of 115 references were observed 2009 followed by 101 in 2011. On other hand it was observed that

36 articles had zero references.

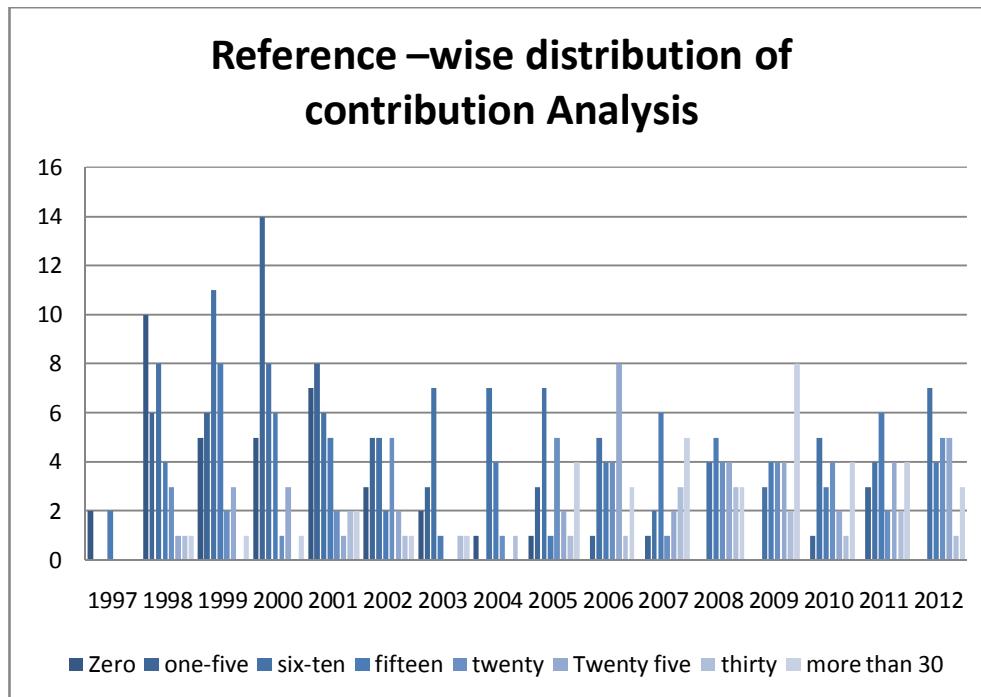


Figure 2: Reference -Wise Distribution of Contribution Analysis

CONCLUSIONS

The publishing inclination absolutely dwells on the output of contributors, patterns of contributions and the quality of research articles. The investigation reveals that importance of IJOEM has been extended to further multidisciplinary area of research with complete importance. This study reveals that the categories of article distributions are significant in this technical paper. The majority of the articles published in this journal were contributed by single author; remaining 288 articles were multi authored which indicates that occupational health and medicine are multidisciplinary area of investigation. It needs to incorporate more fields to safeguard the hypothesis. The Maharashtra State has contributed more articles than any other States; the journal has accommodated articles from 19 different countries, which shows that journal has been internationally circulated and popular among the foreign researcher's community. Majority of the papers were research articles. It can be said that if IJOEM publishes articles in this trends, the scientist will have avenue of good research articles.

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WEB CITES

- <http://www.ijjem.com/backissues.asp>

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